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Certified by

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

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INVENTOR(S)

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☐ *Additional inventors are being named on the _____ separately numbered sheets attached hereto*

TITLE OF THE INVENTION (500 characters max)

ENHANCEMENT TO MS/BSS INTERFACE FOR FAST CALL SETUP

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

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ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Specification *Number of Pages* 5
☐ Drawing(s) *Number of Sheets*
☐ Application Data Sheet. See 37 CFR 1.76
☐ CD(s), Number
☒ Other (specify) return postcard

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

☐ Applicant claims small entity status. See 37 CFR 1.27.
☐ A check or money order is enclosed to cover the filing fees
☒ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 50-0210
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FILING FEE AMOUNT ($): 160

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.
☐ Yes, the name of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted,

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REGISTRATION NO. *(if appropriate)* 25,231

Docket Number: 16818RRUS01P

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

Provisional Patent Application

Title:

Enhancements to MS/BSS Interface for Fast Call Setup

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Submitted on: February 27, 2004

1. Introduction

The proposed invention describes a method of decreasing the call setup delay for packet based applications - such as PTT (Push To Talk), VoIP (Voice over IP) etc. - by enhancing the interface between MS (Mobile Station) and the BSS (Base Station Subsystem).

Here are the main features of this invention.

1. The invention decreases the call setup delay by providing a method for allowing simultaneous processes (as opposed to sequential processes) to be executed within the BSS for the packet based applications (such as PTT and VoIP).

2. The invention provides a method of combining multiple steps into single step within the BSS as a part of the call setup process for the packet based applications (such as PTT and VoIP).

3. The invention also proposes a way to provide special treatment for the packet based applications (such as PTT and VoIP) by identifying and/or remembering these applications.

2. Detailed Description of the Invention

The figure below (Figure 1) shows the sequence of steps to be performed as proposed by this invention. The steps that are shown by the shaded numbers are some of the enhancements proposed by this invention for setting up a packet data call for a specific applications such as PTT, VoIP etc.

The following is a brief description of the sequences shown in the Figure 1.

1. MS sends one of the call setup initiation messages, such as, the Origination message as described in [1] to the BTS (Base Transceiver Station). The MS may also send a Page Response message [1] to initiate the call setup process.

2. The BTS forwards the call setup initiation message (such as Origination message) to the RA (Routing Agent) of the BSC (Base Station Controller). The RA is a functional entity within the BSC – such as the CAU (CDMA Application Unit) of Nortel's CDMA solution – that is responsible for routing the messages within the BSS.

3. The BTS sends the BSAck (Base Station Acknowledgement) message to the MS indicating that the call setup initiation message (such as Origination message) has been received.

4. Upon receiving the call setup initiation message (such as Origination message) the RA identifies this to be a packet data call for specific applications (such as PTT and VoIP) and requires special treatment. It then performs the following two consecutive tasks.
    a) First, the RA forwards the call setup initiation message (such as Origination message) to the MSC (Mobile Switching Center) for further processing (such as authentication, retrieval of user's profile etc.).
    b) Second, the RA requests the RM (Resource Manager) to allocate all of the resources needed within the BSC to complete the call setup process. The RM is mainly responsible for allocating resources such as selecting the appropriate CP (Call Processing) entity, memory resources etc. within the BSC. The RMU (Resource Manager Unit) and ACP (Active Call Processor) components of Nortel's CDMA solution are good examples of an RM and CP modules, respectively.

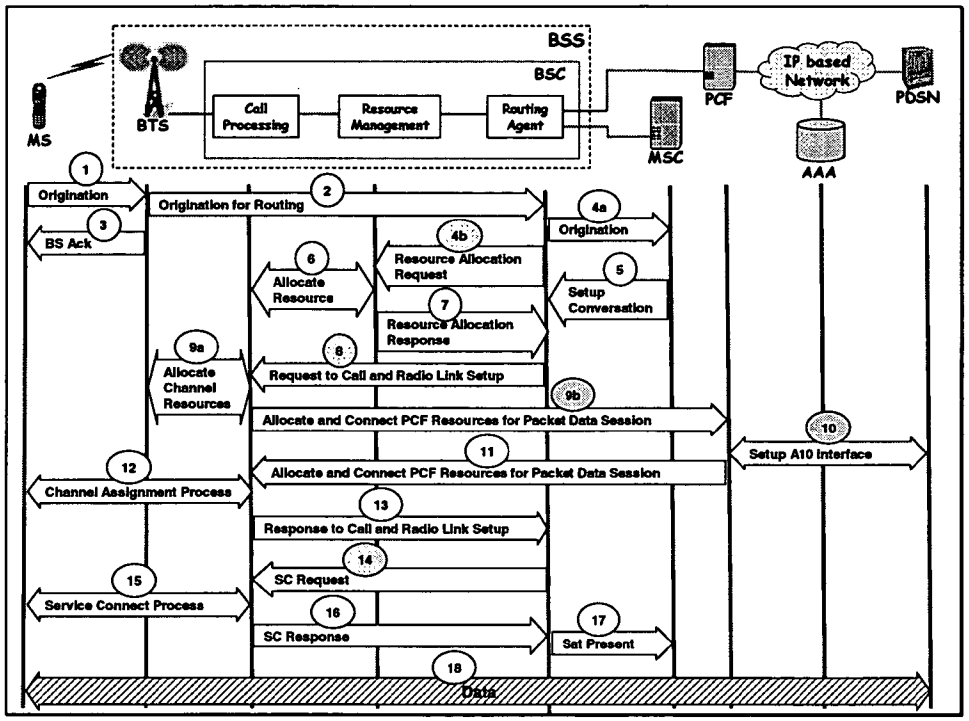

Figure 1: Enhanced Call Setup Sequences

5. The MSC replies with Setup Conversation message that may include the MS's profile such as SCH (Supplemental Channel) capability, SDB (Short Data Burst) supported bit etc.

6. The RM allocates the appropriate CP resources and informs the selected CP module the it has been selected for processing this particular call setup message (such as Origination message) for the packet based applications (such as PTT and VoIP).

7. The RM informs the RA that the appropriate CP module and the other necessary resources with the BSC have been allocated. The RM also provides the identity – such as an IP (Internet Protocol) address – of the CP module to the RA.

8. The RA now identifies this call to be packet data call for specific packet-based applications (such as PTT and VoIP). It, therefore, combines the functions of call setup and radio link setup into a single message before forwarding it to the CP. The objective of this combined message is to request the CP to perform all the necessary tasks needed to setup the call as well as to setup the radio link between the MS and the BSS. In this way, the messages between the RA and the CP are minimized to a single message as opposed to multiple messages. The parameters included in this combined message may include the QoS (Quality of Service) priority and the SDB bit.

9. Upon receiving the combined request to setup the call and the radio link, the CP may perform the following two consecutive functions (among other things).

    a) First, the CP requests the BTS to allocate the radio link related resources. These resources may include a CE (Channel Element), an FCH (Fundamental Channel) and an FCH Walsh Code etc. The CP may also send null frames on the forward FCH as a part of allocating radio link related resources.

    b) Second, the CP requests the PCF (Packet Control Function) to allocate appropriate resources to setup this packet data call for specific packet-based applications (such as PTT and VoIP). The CP may include the Transition ID (to indicate whether the MS is transitioning from Null to Active or Dormant to Active as described in [2]) and the MS's IMSI (International Mobile Subscriber Identity) in its request.

10. The PCF first allocates the appropriate resources necessary to setup this packet data call for specific packet-based applications (such as PTT and VoIP). The PCF's resources may include a block of ROM (Read Only Memory), a packet session ID and a Port ID etc. The PCF may then send an A11-Resigtration Request message to the PDSN to set up an A10 interface as described in [2] to serve specific packet-based applications (such as PTT and VoIP). The PCF may also create a proprietary A10 interface between the PCF and the PDSN.

11. The PCF informs the CP that the appropriate resources as well as the A10 interface have been allocated to setup this packet data for specific packet-based applications (such as PTT and VoIP).

12. The CP, in the mean time, completes the channel assignment process between the MS and the BSS. It is important to note that the task of channel assignment process can continue simultaneously while the steps (9b) through (11) are being performed. The channel assignment process may include CP sending ECAM

(Extended Channel Assignment Message) to MS in the Paging channel, the assigned CE acquiring reverse FCH, the BTS receiving traffic channel preamble from the MS, the CP receiving null traffic data from the MS, the CP sending BSAck message to the MS, the MS sending Ack (Acknowledgement) message to the CP, the CP sending Status Request message to the MS and the MS sending Status Response message to the CP etc.

13. The CP informs the RA that the channel has been successfully setup for this packet data call for serving specific applications (such as PTT and VoIP).

14. The RA requests the CP to send Service Connect message to the MS. The parameter for this message may include the user's Zone ID.

15. The CP completes the Service Connect process – by first sending the Service Connect message and then receiving the Service Connect Complete message – with the MS. The Service Connect message informs the MS that the call has been setup to serve specific applications (such as PTT and VoIP). The parameter for the Service Connect message may include the multiplexing option, coding type, and interleaving type and allowed RCs (Radio Configuration) etc.

16. The CP informs the RA that the MS has been granted access to the BSS to serve specific packet-based applications (such as PTT and VoIP). The CP may inform the RA about MS's SCH capabilities, SDB supported bit and the PCF address etc.

17. The RA sends the Sat Present message to the MSC informing that the MS has been allowed in the network. It may also inform the MSC of the MS's SCH capabilities and SDB supported bit etc.

18. The MS may now launch the specific packet-based applications (such as PTT and VoIP). The MS may establish an RLP (Radio Link Protocol) and PPP (Point To Point) sessions (not shown in the figure) before launching the specific packet-based applications (such as PTT and VoIP).

3. References:

[1] 3GPP2 Access Network Interfaces Interoperability Specification, A.S0001-A Version 2.0, 3GPP2, http://www.3gpp2.org/Public_html/specs/A.S0001-A_v2.0.pdf, June 2001.

[2] Interoperability Specification (IOS) for cdma2000 Access Network Interfaces Part 7—A10 and A11 Interfaces, 3G-IOSv4.3, 3GPP2 A.S0017-A, Version 2.0.1, http://www.3gpp2.org/Public_html/specs/A.S0017-A_v2.0.1_121903.pdf, July 2003.